

# Disease Management Considerations for Producing Strawberry Plug Plants

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Strawberry plug plants are commonly used in the strawberry industry with multiple benefits. Plug plants establish with less overhead watering and management after field setting. Plant size and quality is generally higher and some growers prefer to plant plug plants as compared to bare root plants. Important diseases associated with strawberry plants include anthracnose, bacterial leaf spot, Botrytis crown rot, viruses and phytoplasma diseases, Rhizoctonia or Pythium root rot, Phytophthora crown rot and powdery mildew. In the past 2 or more years we have seen a higher level of anthracnose and Phytophthora associated with plug plants and these problems typically are associated with contaminated tips. Contaminated plants or poor management during the plug production phase can result in substantial losses to plant quality and ultimately fruit production. Observations based on experience also suggests plug plants have higher mite populations than bare root transplants. Apparently, greenhouse conditions favor parasitic mites or limit populations of beneficial mites.

August and early September is the time for rooting tips to produce plug plants for field transplanting. Disease management “tips” to consider are:

- 1) Use tips from a reputable source. Tips can be infected with angular leaf spot, anthracnose or Phytophthora without showing symptoms. Although there are no guarantees, a reputable source of plants is a first wise step. Regretfully, there is no reliable way to sample tips and assure disease is not present. Nursery suppliers who grow plants according to strict certification standards and allow field inspections by independent parties may have reduced risk of problems.
- 2) Carefully cull tips and discard all diseased and questionable tips. If anthracnose is suspected, send samples to the clinic for a rapid diagnosis.
- 3) Sort tips by size and plant accordingly. Small tips rooted in the same tray as large tips results in excess shading of the small tips and provide ideal conditions for Botrytis rot and powdery mildew.
- 4) Avoid excess fertility and misting. Excess moisture and fertility favor disease.
- 5) Ensure adequate ventilation and air circulation. Ventilation and use of horizontal-air-flow fans are needed to limit heat build-up and excessively long periods of leaf wetness (as the misting requirements decrease). Based on field observations, outdoor plug systems appear to have less disease pressure than systems in greenhouses.
- 6) Be vigilant about sanitation, sanitation and sanitation. Field soil carried into the greenhouse on boots, equipment or plant materials may introduce pathogens such as Rhizoctonia and Pythium fungi that cause crown and root rot. Sanitation also includes removal of dead and dying plants in a timely manner and when practical. Maintain a weed free or well-mowed area around plug houses to limit disease problems from weeds or other crop plants.
- 7) Do not produce strawberry plug plants in any location where there is likely to be water originating from ornamental nursery plants. Ornamental plants harbor the pathogen *Phytophthora cactorum* and

this pathogen causes a serious crown rot of strawberries. Never use surface water to water strawberry plants if the surface water drains areas of ornamental plant production. If practical, have trays above soil surface so water cannot move from one tray to the next.

- 8) Use of fungicides is a cloudy issue. Some production facilities produce plug plants successfully without fungicide applications. Others find fungicide use provides benefits in plant quality. Still others receive recommendations that are not legal or will not be effective against the main diseases of concern. According to the EPA Registration Division, if a label bears general directions for use on a crop without restrictions, such as, “for outdoor use only”, “for field use only”, or “not for use in greenhouses”, the EPA Registration Division would most likely determine that the use of that product in a greenhouse on the specified crop would be consistent with the label. It appears plugs produced outdoors would be exempt. Captan should not be used during the early rooting phase since it inhibits rooting. In our field trials where Captan was drenched (i.e. not sprayed on foliage) over plug trays just prior to field setting, plants remained stunted all year.
- 9) **Specific Recommendations:** These recommendations are not based on research results in plug production facilities but appear to be consistent with the label and experience. For fungicide rates, take the per acre rate, add this to 100 gallons and spray for adequate (not over soaking) coverage. Thus, if you need 10 gallons of water to cover the area, use 1/10 the per Acre rate on the label.

Phytophthora: Keep Sweet Charlie plugs separate from others. This variety seems to be very susceptible or planting stock from Canada and California seems frequently infected. Growers may consider using a phosphite-based product (e.g. Prophyt, Aliette, Phostrol etc) 2-3 weeks after setting. Complement this with field application of Ridomil Gold in fields with a history of Phytophthora. (see our previous recommendations at: [http://www.smallfruits.org/SRSFC\\_News/Phytophthora0404.pdf](http://www.smallfruits.org/SRSFC_News/Phytophthora0404.pdf)).

Botrytis: Apply Switch or Elevate + Captan (e.g. CapteEvate) on a weekly schedule beginning 2 weeks after plug setting. E.g. Week 2 = Switch; week 3 = CaptEvate; week 4 = Captan.

Anthracoise: USE certified plants or plants from a reputable source. The Captan sprays for botrytis will suppress anthracnose. Outdoor plugs appear to get less disease than greenhouse plugs. Quadris, Cabrio and Pristine labels state “Do not use for disease control in food crops grown in greenhouses” or “Not for greenhouse or transplant production”. If used on transplants, resistance may develop rapidly and then we will have a serious problem. If hot spots develop, cull these spots and surrounding trays. If the disease is widespread, seek an alternative source of plants. Initiate pring fungicide programs in problem fields (these have worked very well). See our previous detailed recommendations at: [http://ipm.ncsu.edu/current\\_ipm/palert43.html](http://ipm.ncsu.edu/current_ipm/palert43.html).